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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,845	01/05/2004	Sung-Chul Kang	6192.0338.US	3873

7590 03/17/2005

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EXAMINER

CHU, JOHN S Y

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 03/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/750,845

Applicant(s)

KANG ET AL.

Examiner

John S. Chu

Art Unit

1752

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-10 is/are rejected.
- 7) ☒ Claim(s) 5 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office action is in response to the application filed January 5, 2004.

1. The disclosure is objected to because of the following informalities: Claim 3 includes a typographical error for ethyl "acetate"(EL). The intended solvent based on the specification page 5, line 15 discloses ethyl lactate (EL) which appears to be the intended solvent.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 6-10 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by JEFFRIES, III et al (5,346,799) or EBERSOLE (5,324,620).

The claimed invention is drawn to the following:

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1. A photoresist composition for an MMN head coater comprising:

(a) 5 to 30 wt% of a polymer resin represented by the following Chemical

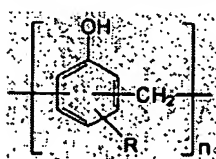
Formula 1;

(b) 2 to 10 wt% of a diazide photoactive compound;

(c) 50 to 90 wt% of an organic solvent; and

(d) 500 to 4000 ppm of a Si-based surfactant:

Chemical Formula 1



wherein R is C₁ to C₄ alkyl, and n is an integer of 15 to 10,000.

JEFFRIES, III et al '799 discloses a photoresist composition comprising a novolak resin made from the condensation reaction of several phenolic compounds and an aldehyde. These compositions further use a photoactive component the claimed o-quinone diazide compounds as disclosed in column 6, line 15 – column 9, line 26 are used as photoresists for making miniature electronic components as well as printed wiring boards. Applicants are specifically directed to column 15, lines 10-61 under "PREPARATION OF PHOTORESISTS", wherein the use of a leveling agent made of alkyl resin/silicone surfactant (lines 41-43) is added to the photoresist composition at a final concentration of 0.3 weight percent (in other words 3000 ppm). This disclosure clearly anticipates the claimed invention at ingredient (d) for the recited "500-4000 ppm of a Si-based surfactant" as recited in claim 1. The disclosure in column 15, lines 30-32 recites the solvent mixture of ethyl lactate and 3-ethoxypropionate used in the photoresist composition. This disclosure anticipates the embodiments of claim 3 for the organic solvent used in the photoresist composition.

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The claimed pattern formation process is anticipated in column 15, lines 62 – column 16, line 18 under the heading “D. Coating, Softbaking, Exposure, Post Exposure Baking, and Developing of the Photoresists”.

EBERSOLE ‘620 likewise discloses a photoresist composition comprising a novolak resin and o-quinone diazide esters as a photoactive compound, see column 5, line 47 – column 7, line 13 for the disclosure of a novolak resin and column 7, line 38 – column 10, line 53 for the disclosure of the o-quinonediazide compound. With respect to the claimed ingredient (d) of “500-4000 ppm of a Si-based surfactant”, applicants are specifically directed column 18, lines 55-59 wherein a “leveling agent” described as an alkyl resin/silicone surfactant was added to give a final concentration of 0.06% (equivalent to 600 ppm).

For the preferred solvent used in the photoresist composition, EBERSOLE discloses the use of ethyl lactate, alone or in a mixture with 3-ethoxy propionate. This disclosure anticipates the claim limitations of claim 3.

The claimed pattern formation process is anticipated in column 19, lines 4 – 37 under the heading “D. Coating, Softbaking, Exposure, Post Exposure Baking, and Developing of the Photoresists”.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 1-4 and 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over JEFFRIES, III et al (5,346,799) or EBERSOLE (5,324,620) in view of KODAMA et al (5,853,949).

The claimed invention has been recited above and is included by reference wherein claim 6 drawn to the addition of a crosslinking agent is shown below:

6. The photoresist composition according to Claim 1, wherein the composition further comprise the nitrogen-containing crosslinking agent of one or more selected from a group consisting of a condensation product of urea and formaldehyde, a condensation product of melamine and formaldehyde, a methylol urea alkyl aldehyde condensate, one of a methylol urea alkylether series, and one of a methylol melamine alkylether series.

Each of JEFFRIES, III et al, or EBERSOLE recite a photoresist composition comprising a S-based surfactant in a composition comprising a novolak resin and a quinonediazide compound. Said references fail to teach the use of a crosslinking agent in the photoresist composition as currently recited in claim 6.

KODAMA et al '949 discloses a positive photoresist composition comprising a novolak resin and a quinonediazide compound with the addition of a polyphenol compound, see column 6, lines 32 – column 7, line 60 for the alkali-soluble resin and photosensitive compound.

Applicants are directed to column 11, lines 46-51 wherein KODAMA et al teaches the use of surfactants being Si-based. In fact the same surfactants as disclosed in JEFFRIES, III et al and EBERSOLE are disclosed here in KODAMA et al, see the surfactant trade name of FLORAD FC-430 in column 11, line 46.

The primary disclosure which the examiner relies on is found in column 12, lines 40-56 wherein KODAMA et al discloses the suitable use of crosslinking agents which serve to improve the dry etching resistance, improve sensitivity and heat resistance, yet not alter the positive working property of the photoresist composition. Specific crosslinking agents include melamine-formaldehyde and others like benzoguanamine and glycouril-formaldehyde. Thus the skilled artisan is motivated to use such components to improve the photoresist image that is formed.

It would have been *prima facie* obvious to one of ordinary skill in the art of positive photoresist compositions to add a crosslinking agent, such as melamine-formaldehyde into the photoresist composition of JEFFRIES, III et al or EBERSOLE as an agent to improve dry etching resistance, and heat resistance and reasonably expect same or similar results as disclosed in JEFFRIES, III et al or EBERSOLE for high thermal resistance and low scumming upon development.

6. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim 5 recites a specific surfactant, which is not disclosed in any of the prior art references of record.

7. Applicants are asked to provide any related information under 37 C.F.R. 1.105 for the surfactant of ingredient (d), which is sold as a commercial product; and/or information such as trade names of the surfactant and/or uses in formulations described as a trade name products.

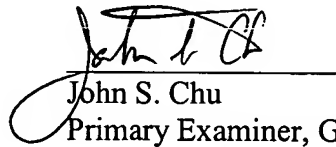
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8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Chu whose telephone number is (571) 272-1329. The examiner can normally be reached on Monday - Friday from 9:30 am to 6:00 pm.

The fax phone number for the USPTO is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (571) 272-1700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PMR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


John S. Chu
Primary Examiner, Group 1700

J.Chu

March 9, 2005